5. Natural Environment

Introduction

The natural resources of the Community.

This section summarizes the Natural Environment of the Central Area. Components of this environment include:

- Primary Environmental Regulation Agencies;
- Water Quality;
- Air Quality;
- Brownfields;
- Water Bodies;
- Geology and Soils;
- Flood Zones;
- Vegetation;
- Wetlands; and
- Wildlife

As urban development has progressed, it has altered and fragmented these components. The following assessment will help to establish a current benchmark of their condition.

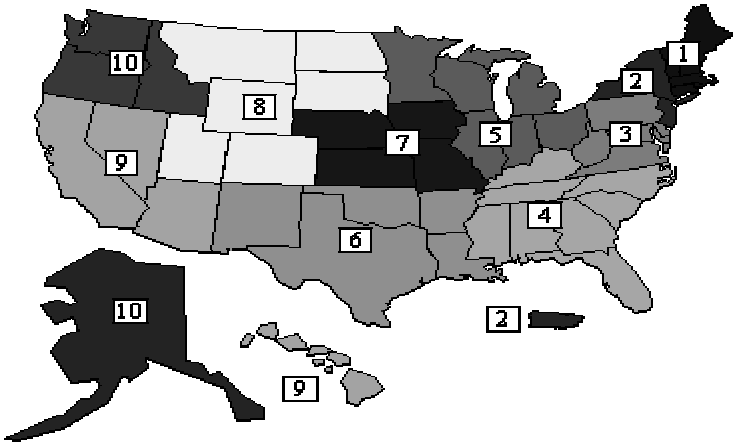
Primary Environmental Regulation Agencies

Natural resources within the Central Area are subject to State and local protection and regulation. The following primary agencies are tasked with the enforcement of these regulations:

The Environmental Protection Agency (EPA)

The mission of the U.S. EPA is to protect human health and to safeguard the natural environment -air, water, and land- upon which life depends. The agency has many programs that provide information, testing, management and funding for state and local governments in their effort to create and maintain a clean and healthy natural environment. This federal program has 10 geographic districts (**Figure 5.1**).

FIGURE 5.1 - U.S. EPA District Map



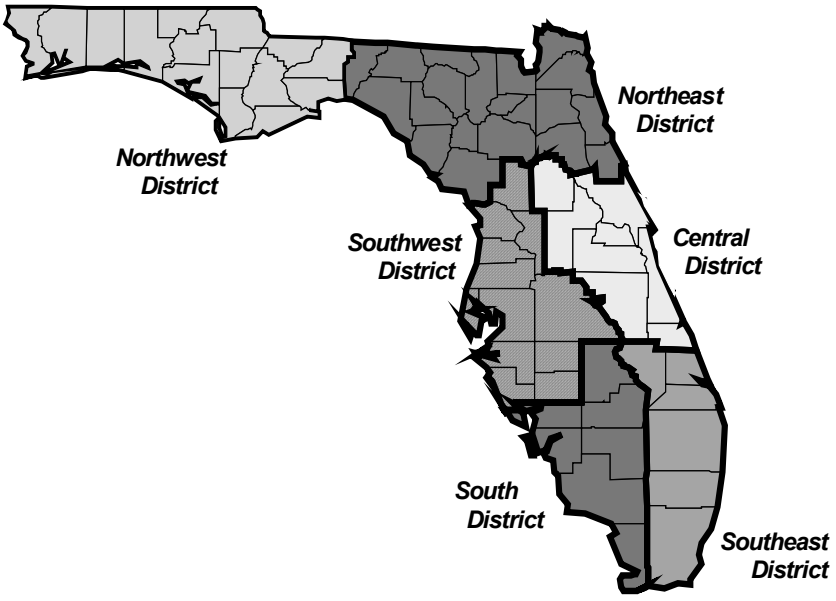
Source: U.S. EPA

Florida Department of Environmental Protection (DEP)

This agency provides "stewardship of Florida's ecosystems so that the State's unique quality of life may be preserved for present and future generations".

The City of Fort Lauderdale is located in the DEP's Southeast District, which encompasses Dade, Broward, Palm Beach, Martin, St. Lucie, and Okeechobee Counties (**Figure 5.2**).

FIGURE 5.2 - Florida DEP Districts



Source: Florida Department of Environmental Protection

South Florida Water Management District (SFWMD)

The South Florida Water Management District encompasses all or part* of 16 counties:

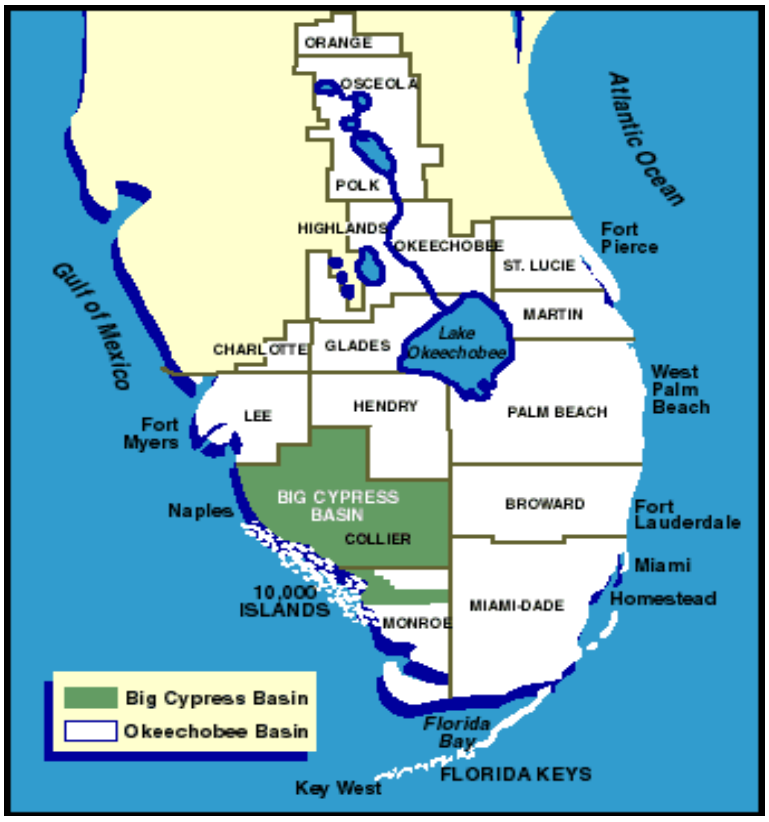
Broward	Glades	Martin	Osceola*
Charlotte*	Hendry	Monroe	Palm Beach
Collier	Highlands*	Okeechobee*	Polk*
Dade	Lee	Orange*	St. Lucie

Almost 6 million people live within this district, which covers a total area of 17,930 square miles.

Water management district boundaries are based on natural, hydrologic basins rather than political limits -- to allow for effective and efficient planning and management of regional water resources. These boundaries were defined in Florida's 1972 Water Resources Act.

The agency provides flood control protection and water supply protection to residents living and working in cities or on farms within this region; and is working to restore and manage ecosystems from Kissimmee River to the Everglades and Florida Bay (**Figure 5.3**).

FIGURE 5.3 - South Florida Water Management District Map



Source: South Florida Water Management District

Broward County Department of Planning and Environmental Protection (DPEP)

The Department of Planning and Environmental Protection (DPEP) is a multi-faceted agency responsible for management of Broward County's population and infrastructure growth while ensuring protection of the region's natural resources. The DPEP maintains a professional staff and provides numerous services including engineering and environmental plan reviews, permitting and project management; short and long range strategic, transportation, development and neighborhood planning; and management of environmental resources including beaches, wetlands, trees and sea turtles. Through licensing, regulation and educational outreach programs, the DPEP ensures that businesses that handle hazardous materials comply with relevant environmental legislation, land owners and developers maintain sound and responsible land use activities, and population and infrastructure growth are monitored. The DPEP also assists other governmental and private entities with technical guidance, distribution of information, contract support and 24-hour environmental complaint response capabilities.

Because Broward County is one of the most densely populated counties in Florida, the demands of this growing population must be balanced with protection of the environment and promotion of environmentally sound growth. Through regulation, education and public outreach the DPEP is helping to ensure that continued growth remains compatible with protection and preservation of existing natural resources

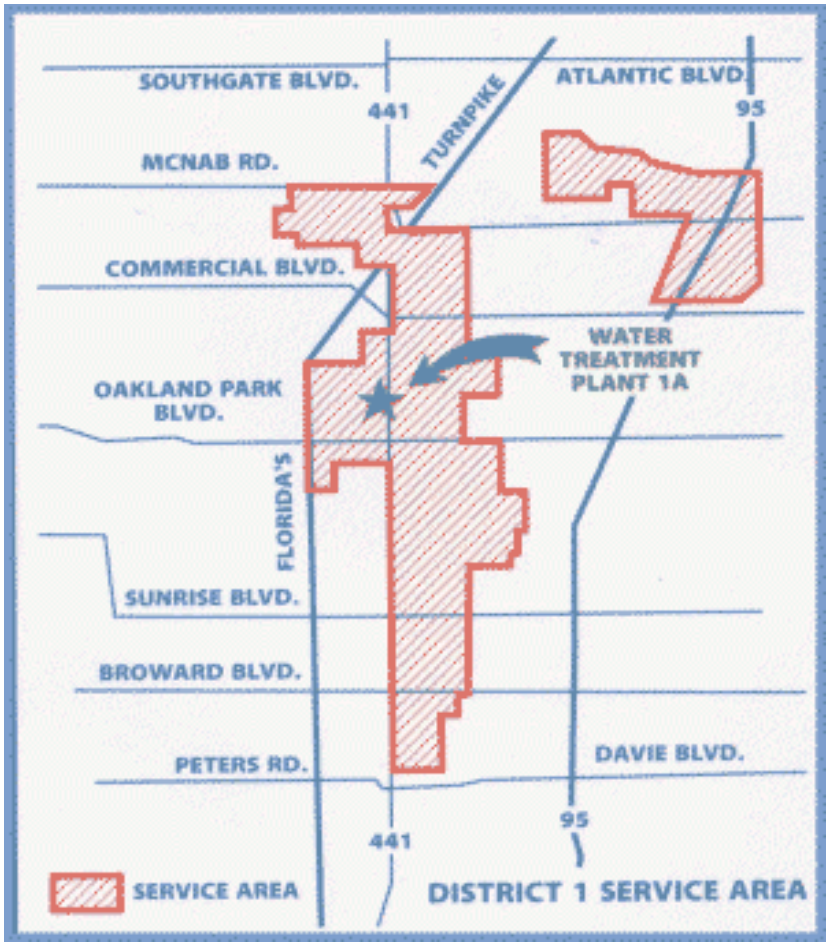
Broward County Office of Environmental Services (OES)

The Broward County Office of Environmental Services (OES) provides retail water and sewer services for over 50,000 customers, regional wastewater services for over 600,000 citizens, and storm water and canal management services supporting aquifer recharge and flood management throughout Broward County. The agency has several service areas for water management. The Central Area falls within OES's District 1 Service Area (**Figure 5.4**).

The goal of OES is to provide its customers with high quality, safe, and reliable drinking water that surpasses federal and state standards. In order to ensure tap water is safe to drink, the United States Environmental Protection Agency (EPA) regulates the amount of certain substances in water provided by public water supply systems. Drinking water must meet both health (primary) and aesthetic (secondary) standards. Primary standards are designed to protect public health and limit particulate matter, turbidity, chemical compounds, and bacteria in drinking water. Secondary standards, such as color, odor, and pH, are aesthetic in nature and are established to enhance consumer acceptance. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants, however, the presence of contaminants does not necessarily indicate that water poses a health risk. The risk of undesirable microbial pathogens being introduced into our drinking water is minimized by the naturally protective characteristics of the Biscayne Aquifer.

Natural filtration, coupled with long travel times through the aquifer, offers good protection from undesirable pathogens (such as Cryptosporidium and Giardia). While the likelihood of occurrence of these pathogens in a groundwater supply is minimal, OES, as an added precaution, has taken the initiative to sample representative wells for the presence of Cryptosporidium and Giardia. As expected, no detectable levels have been found.

FIGURE 5.4 - OES District 1 Map



Source: Broward County OES

City of Fort Lauderdale's Department of Public Services

As one of the divisions in Public Services, the Environmental Resources Division provides compliance monitoring services as well as chemical and microbiological analysis for drinking water, wastewater, recreational water and stormwater systems to ensure that these functions comply with expanding local, state and federal health and environmental rules and guidelines. The laboratory is state certified and performs testing services for other City departments and municipalities.

The Environmental Services Division is charged with protecting the infrastructure of the Public Services Department either by damage or misuse. This infrastructure includes, but is not limited to water mains, lines and meters; wastewater mains and pumping stations; and stormwater lines, catch basins, and outfalls.

The Division also administers the State and County required backflow and cross-connection control program, the federally mandated and state controlled industrial pretreatment program, and

the federally mandated stormwater permitting program. It is also responsible for hazardous materials disposal and many forms of environmental sampling for the entire City.

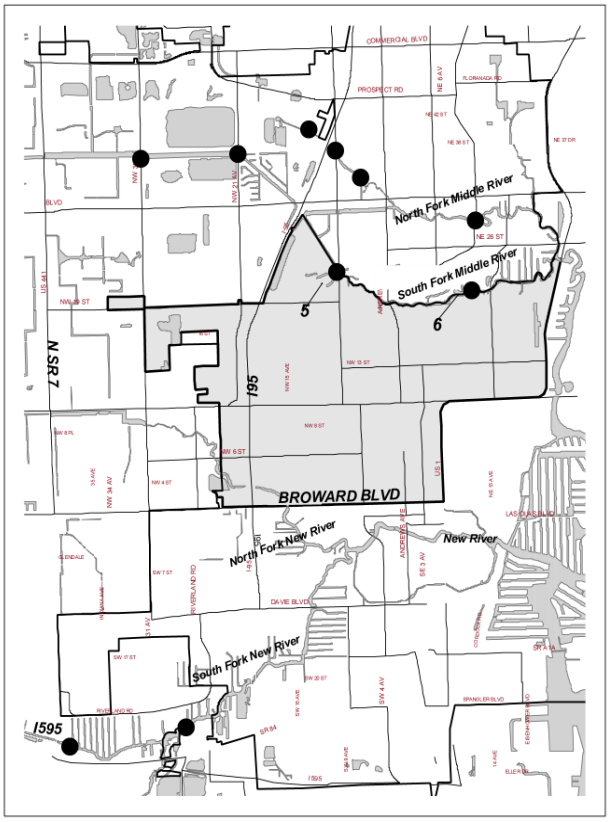
Water Quality

The City's Public Services Department monitors ground water for chloride levels. Such testing monitors the extent of salt-water intrusion, or more specifically, the encroachment of saltwater into the freshwater Biscayne Aquifer. This aquifer is the source of all South Florida drinking water. There are 13 City testing sites for chloride levels, some of which are located outside the municipal boundaries. **Figure 5.5** shows the location of 10 of these. Two of these testing sites, #5 and #6, are located within the Central Area on the South Fork of the Middle River.

The City's Environmental Services Division also performs bacterial testing along the beach and at Snyder Park in the south of the City. Currently there is no bacterial testing in the Central Area; however, Environmental Services may include Mills Pond Park in the future.

The DPEP also has a water-testing program with 61 groundwater-monitoring stations countywide. Although none are located in the Central Area, five are located within three miles of its boundaries.

FIGURE 5.5 - City of Fort Lauderdale Water Quality Testing Sites in Proximity to the Central Area



Source: City of Fort Lauderdale

Air Quality

Air quality is monitored by the DPEP throughout the County. One such monitoring site is located in the Central Area at Lincoln Park (**Figure 6.6**). Air quality in the City of Fort Lauderdale is dependent upon the interaction of climatic conditions and urban activities. Automobiles account for 92% of non-point air pollutants in the City and County.

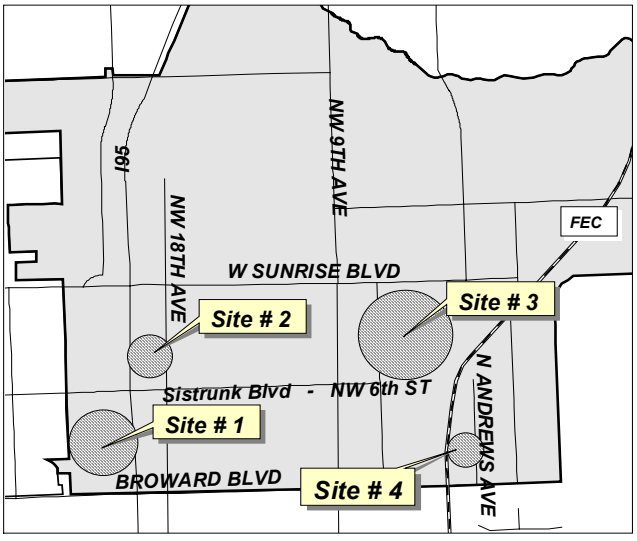
According to the DEP, the overall quality of Broward County's air quality is considered good.

Brownfields Reclamation

The EPA has selected the City of Fort Lauderdale for a Brownfields Pilot Assessment Grant. This EPA initiative is designed to empower states, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and successfully reuse Brownfields. A Brownfields is a site that has actual or perceived contamination and an active potential for redevelopment.

In the Central Area, there are four sites involved in the Brownfields Pilot Program (**Figure 5.6**). This program may aide in an appraisal of the management of the natural environment of the Central Area. Site #1 (Broward Boulevard Site), located in the northwest corner of Interstate I-95 and Broward Boulevard, encompasses 9.7 acres. Site #2 (Lincoln Reuse Area), directly north of Sistrunk Boulevard between interstate I-95 and Northwest 18th Avenue, consists of 7 acres. Site #3 (Proposed Technology Park) is a 163 acre area bound by Sunrise Boulevard, the Florida East Coast (FEC) Railway, Sistrunk Boulevard and Northwest 9th Avenue. Site #4 is located directly south of Sistrunk Boulevard between North Andrews Avenue and the FEC Railroad. Sites #3 and #4 will be considered for development into a linked greenway, connecting Sunrise Boulevard with the Riverwalk and offering the area a pedestrian walkway-bikeway alternate transportation route.

FIGURE 5.6 - Brownfields Sites Within the Central Area



Source: City of Fort Lauderdale, OCCP

Water Bodies

There are approximately 84 miles of navigable waterways and canals in the City. The Florida Department of Environmental Regulation (DER) designates all the surface waters of the City as Class III waters, which provide for recreational use, and for fish and wildlife propagation. The City's reservoir, Prospect Lake, is a 600 million gallon body of water designated by the DER as a Class I water body, for public water supply use.

The City currently uses deepwell injection for the disposal of all wastewater. No effluent is dumped into the surface waters of the City or the Atlantic Ocean. The City's stormwater drainage system collects stormwater from streets and discharges it into surface waters.

There are no natural lakes in the Central Area, however, there are approximately 3.2 miles of river frontage, part of the South Fork of the Middle River along the northern boundary of this area. Although it has been channelized and dredged in many areas, the Middle River is a natural formation in which no boating recreational facilities are located along this stretch of the Middle River. Fishing is permitted on this waterway, using spin rods (license required) or cane pole (no license required). Sunfish, bluegill, and small largemouth bass are possible catches. East of Dixie Highway, the South Fork provides navigable water access to the Intracoastal Waterway.

Geology and Soils

Geology

The Florida Peninsula and the adjacent continental shelf occupy a geologic feature named the Floridan Plateau. This subsurfant feature forms the platform upon which the upper layers of Florida's bedrock rest. Its underlying layers are igneous and metamorphic in nature, composed of thick, mostly carbonate rocks deposited during regional subsidence and eurstatic sea level changes. The carbonate deposits are from shell, limy mud, sand bars and coral reefs as well as calcium precipitates during periods of shallow sea level. It is from this mix that Florida's soils were formed.

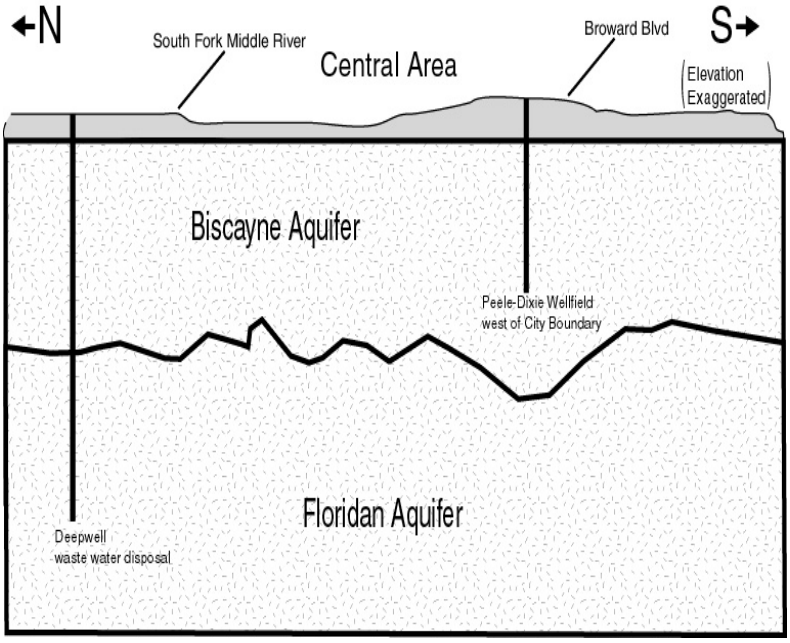
Related geologic processes also established the complexities of South Florida's natural hydrology. Fort Lauderdale is situated between what had been an eastward flowing fresh water drainage basin and a southern flowing fresh water slough of the southeastern edge of the Everglades. This two-directional water flow was due to the presence of the Atlantic Coastal Ridge, a pre-Holocene sand dune crest that runs the length of Florida's east coast from Jacksonville to Miami. The placement of this ridge kept the waters of the Everglades to the west. East of the ridge, the area flooded during the wet season and was grasslands during the dry season. The immediate underlying rock, öolite limestone, sits at a higher surface height than the bryozoan limestone to the west in the Everglades. Having a low density and high permeability, the öolite limestone acted as sponge and its presence created a higher water table than that found west of the ridge. Pressure from the high water table prevented eastward seepage of water from the Everglades. This hydrostatic pressure was high enough to create fresh water springs in the Biscayne Bay area. Water drainage has reduced most of these.

The digging of canals has allowed for the drainage of surface water from the Everglades, providing land for farming and municipal development. It has also lowered the water table and

increased salt water intrusion. Constant movement and pumping of water maintains an equilibrium between fresh water reserves and salt water intrusion.

As depicted in **Figure 5.7**, two aquifers lie below the surface of Florida: the open Biscayne Aquifer and the closed Floridan Aquifer. South Florida's drinking water comes from the Biscayne. Its recharge area is local, from Lake Okeechobee southward. Currently, the Floridan is used as a receptacle for treated water from sewage treatment plants so that the local aquaclude will prevent the movement of water upwards into the Biscayne Aquifer.

FIGURE 5.7 - Geology of the Central Area



Source: City of Fort Lauderdale, OCCP

Soils

The soil composite of the Fort Lauderdale area is a limestone, muck and shell mix of varying percentages and small particle size. Geologists have identified 15 soil types in the South Florida area. The many types of soils in the City have become mixed and no longer represent the original, natural compositions during the process of settlement. Knowledge of soil types can be useful in determining the suitability of community development or recreational activities.

Critical factors in determining suitability include bearing capacity, stability, and permeability. Undisturbed Florida soils that have a percentage of organic muck are prone to shrinkage and settlement upon displacement and must be carefully examined for developmental use.

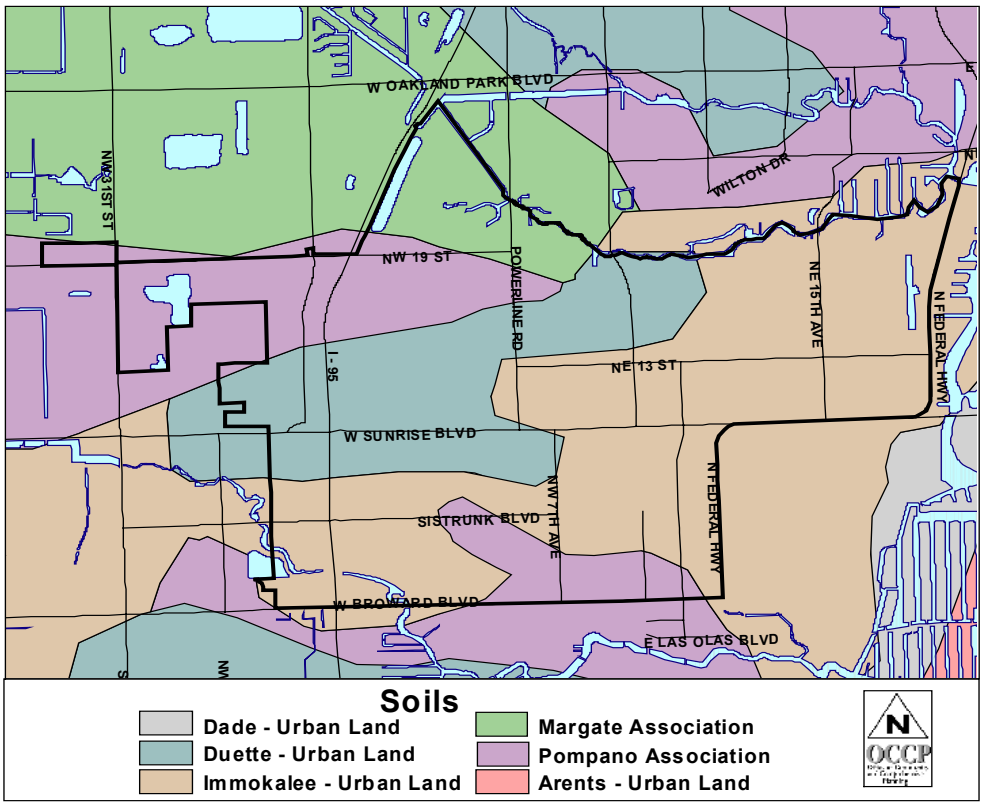
A survey conducted in Broward County by the Soil Conservation Service (BCSCS) identifies the following soils within the boundaries of the Central Area (**Figure 5.8**):

- Duette-Urban Land Association
- Pompano-Urban Land Association
- Immokalee-Urban Land Association
- Margate-Urban Land Association

Florida soils are classified according to a natural layering of sand, organic materials, minerals and shell remains. The aforementioned soil types vary according to original land elevations and surface or sheet water conditions prior to drainage and water management. The Duette soils are indicative of slightly elevated areas while the Pompano, Immokolee and Margate soils originally occurred in poorly drained and seasonally wet or flooded areas.

A study of these Central Area soils suggests that originally the area experienced water accumulation from surface saturation to slightly flooded natural conditions during the summer wet season. Water management has altered the extent of this water movement with a lowered water table and drainage canals. Topographically and geologically, however, the area is still likely to experience moderate water retention during heavy rains.

FIGURE 5.8 - Soil Survey, Central Area

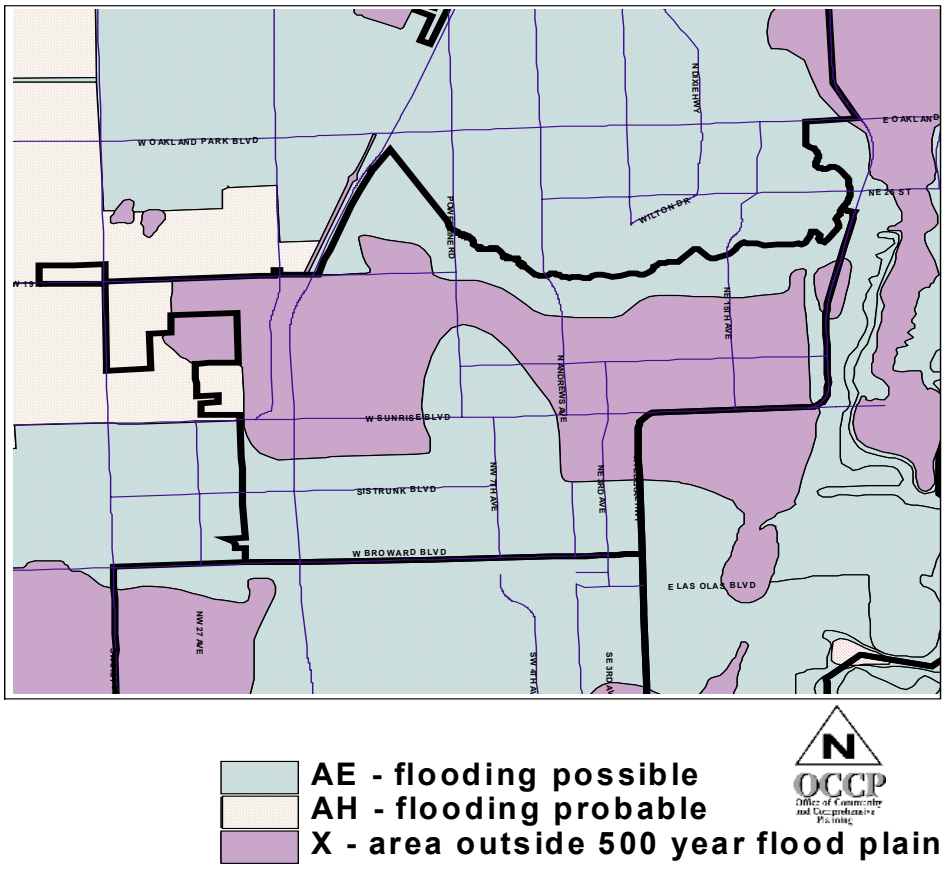


Flood Zones

The elevation and natural conditions of the Central Area make most of its area subject to flooding. Though this was an integral part of the natural environment, with wetland communities dominating much of what became the City and surrounding municipalities a great deal has changed due to urban development pressures. Dredging, fill and canals have altered the natural sheet flow of water. Though these water removing devices exist, flooding may still occur as a result of heavy rainfall, coastal storms, hurricane storm surge, and urban runoff from impervious surfaces.

Fort Lauderdale has become a recognized participant in the National Flood Insurance Program (NFIP) due to 70% of the City falling within the 100 year floodplain (**Figure 5.9**). For the Central Area, about 25% of its area has an NFIP zone classification of AE or AH, meaning that there is a potential the area will experience flood conditions during severe rainfalls. The other 75% of the Central Area falls within the 500-year floodplain. Yet of the 12 neighborhood associations in this area, all of them are entirely within or have a portion of their boundary overlapping the AE or AH flood prone area, as defined by the NFIP.

FIGURE 5.9 - FEMA Flood Zones, Central Area



Vegetation

The Broward County Soil Conservation Service (BCSCS) identifies 26 different types of ecological communities in the County. Seven of these had been native to the Fort Lauderdale area. Original ecological communities of Fort Lauderdale included:

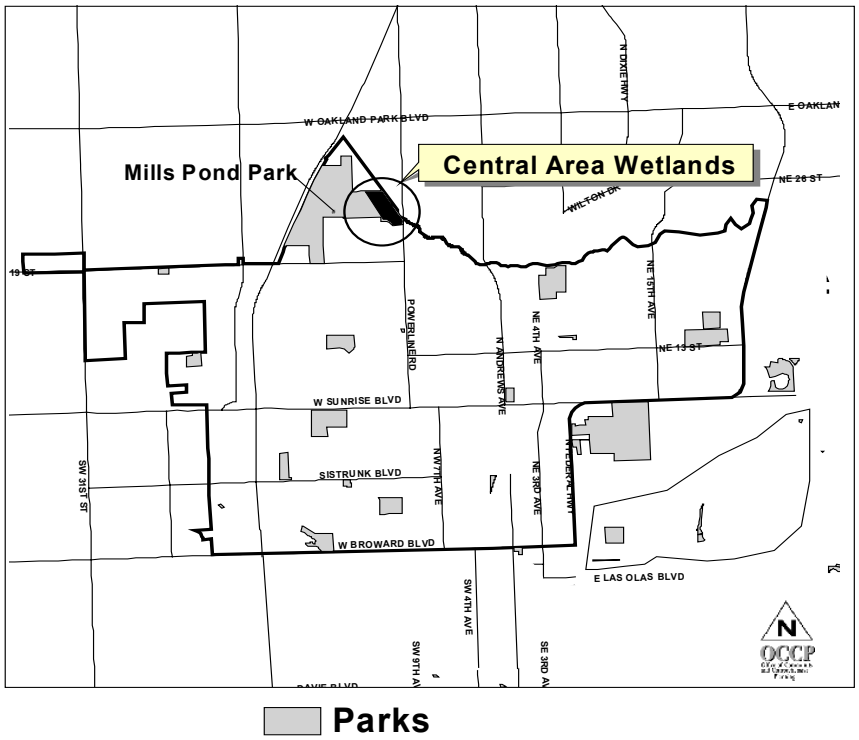
- Mangrove Swamp Plant Community
- Cypress Swamp Plant
- Community Oak Hammock Plant Community
- Tropical Hammock Plant Community
- South Florida Flatwood Plant Community
- Sand Pine Scrub Plant Community
- South Florida Coastal Strand Plant Community
- Beach and Dune Plant Community

Prior to development, the vegetation of the Central Area had largely been Cypress Swamp and Oak Hammock Communities. The channelization of the Middle River and the development of both Port Everglades and the Intracoastal, caused an increase in the salinity of the River and fostered Mangrove Swamp Plant Communities along the River. The presence of mangroves at Mills Pond Park is a remnant of such changes (**Figure 5.10**). Although Cypress Swamp Plant Communities no longer exist in the Central Area, there are a few cypress trees located at Stranahan Park, just outside the Central Area. Similarly, true Oak Tree Plant Communities are no longer found though individual oak trees can be found throughout the area.

Many areas of Fort Lauderdale, have compromised vegetation communities with the presence of invasive exotics. Invasive exotics are plants from other locations of the world that have purposely or accidentally been introduced into a different environment. Without environmental, animal, other plant, pest, or microbiotic inhibitors, these plants are able to easily establish themselves and reproduce quickly, out-competing native vegetations. Many invasive exotic plants are also characterized as first order or colonizer plants because they thrive in recently disturbed areas, rooting by seed or vegetatively quicker than locale plant species.

Australian Pine (*Casuarina equisetifolia*), Brazilian Pepper (*Schinus terebinthifolius*) and Melaleuca (*Melaleuca quinquenervia*) are the three most common invasive exotic tree species to be found in both the Central Area and the City as a whole. In the Central Area, Melaleuca is present on many private properties, while Brazilian Pepper has demonstrated to be a significant problem at Mills Pond Park.

FIGURE 5.10 - Wetland Map, Central Area



Wetlands

Wetlands in the City of Fort Lauderdale are a limited resource. The Broward County Biological Resources Division, Wetlands Section, is charged with monitoring wetlands through the implementation of Chapter 27, Article XI, Sections 27-331 through 27-341, "Aquatic and Wetland Resources Protection." The current version of this article was adopted on November 23, 1993.

The Mills Pond Park site, the only wetlands located in the Central Area, contains approximately 17 acres of wetland vegetation (**Figure 5.10**). This site has two types of plant communities: salt tolerant plants and fresh water native plants. The salt water community contains Mangroves, Button Wood, and Coin Vine specimens. The fresh water community contains Cypress, Strangler Fig, Red Bay, and Pond Apple. Both of these sites also contain heavy infestations of Brazilian Pepper.

Wildlife

Birds and small animals are present in the Central Area. These include seasonal migratory birds and resident species. Vegetation on private and public properties offers food, habitat and roosting options to birds. The gray squirrel, raccoon, opossum, marsh rabbit, as well as small lizards, turtles, snakes, and other reptile and amphibian species may all occasionally be found in the area. Most have adapted to the urbanized environment and populate the area dependent upon the availability of food and shelter.

There are no sites in the Central Area that are dedicated as nature, ecological, or environmental preserves. Animals found in the Central Area are the result of happenstance and adaptability, not as return on an environmental investment in landuse.